

PATENT SPECIFICATION

982,273

NO DRAWINGS.

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COMPLETE SPECIFICATION.

Improvements in or relating to Wound Yarn Packages.

5 We, BRITISH NYLON SPINNERS LIMITED, of Pontypool, Monmouthshire, a British Company, do hereby declare the invention, for which we pray that a patent may be granted to us, and the method by which it is to be performed, to be particularly described in and by the following statement:—

10 The present invention concerns improvements in or relating to wound yarn packages, that is packages formed by winding yarn on to bobbins, tubes or other formers.

15 Yarn is usually wound into such packages by rotating the bobbin or other former and by laying the yarn in coils therealong. The shape of package so wound will be dependent on the so-called builder motion, which is the motion imparted to the means for laying the yarn in coils along the bobbin. If the bobbin is merely tubular in shape, it will often be desirable from the point-of-view of the stability of the package that the ends thereof shall be tapered, so that they are generally frusto-conical in shape. This is particularly the case when fine filament yarns, such as those of nylon, are wound up by ring-spindle apparatus. Builder motions to achieve such tapered yarn packages are well-known.

20 In addition to the shape of the wound yarn packages, the lay of the coils of yarn in such packages is a matter of importance, both to stability and to the ease of take-off of the yarn on subsequent usage.

25 By the expression "lay of the coils," we mean the manner in which adjacent coils in a given layer are laid down next to one another, so as either to be contiguous to, or to be spaced from, each other, and so as either to cross one another at one or more points in each circumference, or to remain parallel to one another around their circumferences.

[Price 4s. 6d.]

Basically, the lay of the coils of yarn can result in either an "open" wind or a "close" wind. In an "open" wind, the winding conditions are such that the coils are laid on well spaced from one another and with the line of the coils forming a substantial angle to a line normal to the axis of the bobbin; and this is sometimes referred to as "cross-winding."

30 In contradistinction, a "close" wind is brought about by substantially flat coils (sometimes called "parallel wind") wound very close to one another.

35 As an effective compromise between the above two basic types of wind, however, it has already been proposed in our British Patent Specification No. 800,555 to wind yarn by means of ring-spinning apparatus in such a way that a high-speed to-and-fro motion is superimposed on the traverse motion, and cross-winding takes place. In this instance, however, the cross-winding is somewhat different from that referred to above in that the coils are substantially flat, i.e. they have no substantial angle between their mean line and a line normal to the axis of the bobbin, but they have a wavy configuration which ensures that adjacent coils of any one layer will, at certain points in each coil, cross one another.

40 Such a compromise wind has found very wide utility in practice; and it often has advantages, compared with an ordinary "close" wind, of package stability and softness and of ease of take-off. The usual manner of effecting the superimposed high-speed to-and-fro motion is to tilt the ring so that its axis is at a small angle, say 3°, to that of the spindle upon which the bobbin is rotated.

Greater familiarity with packages wound,

inter alia, in accordance with the above-mentioned British Patent Specification has demonstrated to us, however, that there are sometimes advantages in having the lay of yarn different in certain portions of the package from that in others. In such a way, the advantages of a "cross," or "open," wind can be utilised in those portions where they are really needed, e.g. for stability; and other portions of the package can be wound with a different lay, such as a "parallel wind," so that, for instance, the greatest possible length of yarn can be incorporated in a given package build.

This invention, therefore, consists in a double-taper yarn package comprising coils of yarn laid in layers on a former to form an integral yarn supply, the lay of the coils in an axially or radially distinct wound portion of the package being different from that in another axially or radially distinct wound portion.

Suitably, the wound yarn package is a double-taper package wound by a ring-spindle apparatus on a cylindrical core; and the package build may be a so-called pirn build in which the traverse stroke is progressively shifted upwardly throughout the build, or it may be a so-called multi-cycle build, in which the traverse stroke at either or both ends of the stroke is alternately lengthened and shortened throughout the build. Again, the build may be a composite one in which the lower tapered portion is produced, for instance, by a half-cycle progressively shortening traverse stroke, and the top tapered portion is produced, for instance, by a multi-cycle traverse stroke.

Whatever the package build, however, the lay of the coils in the distinct portions must be different. Thus, the lower tapered end-portion might be wound with a lay such as that resulting from tilting of the axis of the ring, as described and claimed in our British Patent Specification No. 800,555, such lower tapered end-portion being an axially distinct portion in the context of this invention, and the remainder of the package be wound with a "parallel wind." Alternatively, the inner layers of a double-taper package might be wound with a "parallel wind," such inner layers being a radially distinct portion in the context of this invention, and the outer layers be wound with a lay as described and claimed in our British Patent Specification No. 800,555.

Any variation in lay in a given layer of the package, such variation resulting solely from a gradually varying rate of traverse or of

spindle speed or of both, does not constitute a "different" lay in the terms of this invention; because, although such variation may be valuable in its own right, this invention, as such, is concerned only with radical differences in lay in the respective portions, such as between "cross-wind" and "parallel wind."

As already referred to, the invention is particularly useful in winding wound packages of continuous filament yarns, such as those of nylon, whether monofilament or multifilament.

WHAT WE CLAIM IS:—

1. A double-taper yarn package comprising coils of yarn laid in layers on a former to form an integral yarn supply, the lay of the coils in an axially or radially distinct wound portion of the package being different from that in another axially or radially distinct wound portion.
2. A yarn package according to Claim 1 in which the build is a pirn build.
3. A yarn package according to Claim 2 in which the lay of the coils in the lower tapered end-portion is such that adjacent coils in any given layer cross one another, and the lay in the remainder of the package is a "parallel" wind.
4. A yarn package according to Claim 1 in which the build is a multi-cycle build.
5. A yarn package according to Claim 4 in which the inner layers of the package have a "parallel" wind lay and the outer layers have a lay in which adjacent coils in any given layer cross one another.
6. A yarn package according to Claim 1 in which the build is a composite build having a lower tapered end-portion wound with a half-cycle progressively shortening traverse stroke and a top tapered end-portion wound with a multi-cycle traverse stroke.
7. A double-taper yarn package having a differing lay of the coils in axially or radially distinct wound portions thereof substantially as hereinbefore described.
8. A process for producing a double-taper yarn package according to any one of the preceding Claims in which the yarn is wound in a double-taper package by means of a ring spindle apparatus and the ring is angulated with respect to the horizontal by a differing amount in the axially or radially distinct wound portions.

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